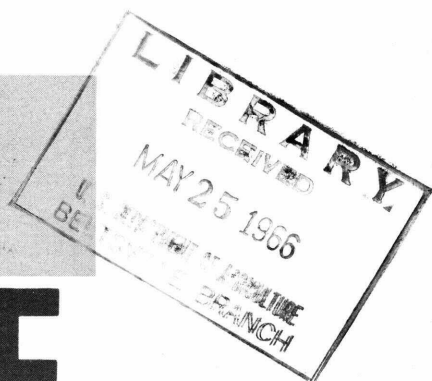


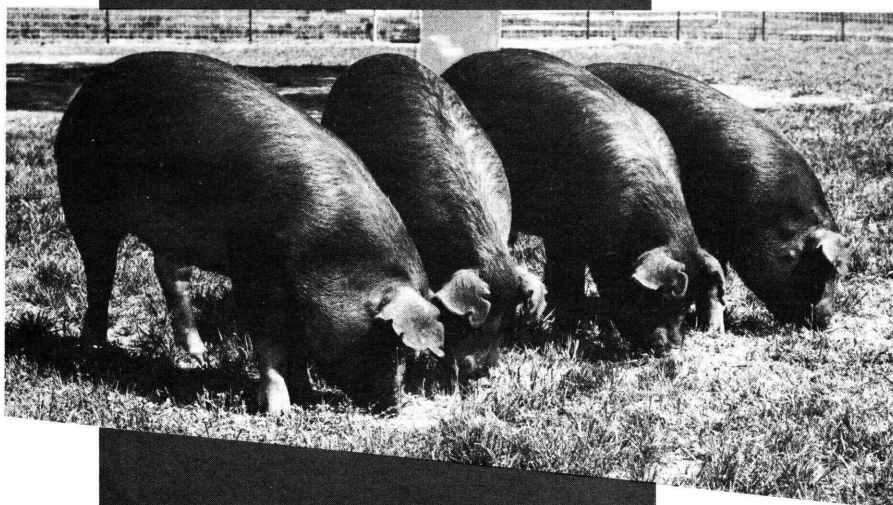
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SWINE



PRODUCTION

Farmers' Bulletin No. 2166

U.S. DEPARTMENT OF AGRICULTURE

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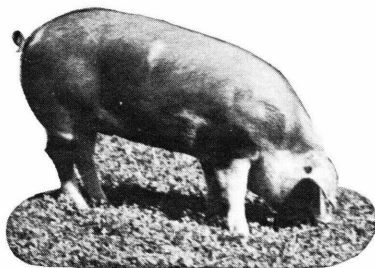
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SWINE PRODUCTION

Swine producers who use sound practices of breeding, feeding, and management usually make a profit.

If you are planning to raise hogs, you should begin by finding out if a supply of feed is available. Your farm should produce abundant feed or be in a cash-grain farming section. Your farm should be accessible to markets so that you can sell the hogs you raise.

NUMBER OF HOGS TO RAISE

Begin hog raising on a small scale. After you develop the necessary skills, gradually increase the herd size to fit your farm.

Expanding too quickly could lead to overstocking in feed, labor, equipment, or housing, or to neglect of other farm enterprises. Be careful to avoid conflicts of your farming schedule—farrowing versus planting or harvesting. These conflicts can cause serious losses in total farm income.

Once you determine the number of hogs that best fits your particular farm plan, stick to this number unless some major change—in size of farm or in cropping—indicates a larger or smaller herd.

Most successful hog raisers produce at a uniform rate and concentrate on reducing waste and increasing efficiency.

In figuring the number of hogs you can raise on the feed available, including byproducts and water. Feeds that can be salvaged by hogs are skim milk, grain, field gleanings, unmarketable products from truck farms, and grain in droppings from fattening steers.

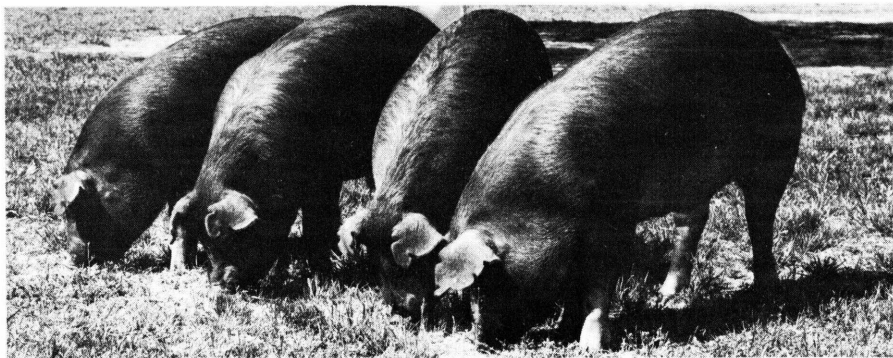
SELECTING BREEDING STOCK

Sows

Foundation sows for the herd should have meat-type body conformation, high milk production, and good weight for age. They should be physically sound. If production-tested sows are unavailable or prices are too high, select them on individual merit.

Desirable Conformation

The prospective brood sow should have a long body with a full spring of rib. The back should be uniform in width and the shoulders should be smooth. Along the top-line, the back should be moderately



BN-12279

Good meat-type gilts.

arched and full and thick at the loin.

The sides should be long, deep and smooth; the ham should be wide and well developed, carrying down to within 2 inches of the hock. The jowl, underline, and base of the ham should be trim. The legs should be strong, of medium length, and should have good feet and strong, short pasterns. The sow should have 12 to 14 good teats, open and without deformity.

Select breeding females from litters of 10 or more pigs out of sows that consistently produce large litters.

Profitable Life

The profitable life of a gilt or sow differs with the type of operation and with each farm.

Do not replace all gilts after their first litter. Instead, keep the best one-third to one-half of the gilts for a second litter. Having sows farrow two litters a year will give you more information for selecting young boars and gilts to be kept in the herd.

This system also permits sows to remain in the herd if they are superior to any of the gilts that would replace them. If distinctly superior, keep some of the best sows for a third or fourth litter.

When you select sows for additional litters, consider the number of pigs they produce and the weaning weight of the pigs. Also, consider the gilt's own growth and meat-type conformation.

Crossbred sows are often kept for their superior performance in prolificacy, milk production, and mothering ability.

Systematic crossbreeding programs are usually based on group standards of performance. These standards are maintained by hybrid vigor in the female line and the use of superior, production-tested males.

In order to obtain the maximum benefits from crossbreeding, all sows should be replaced after producing a planned number of litters. The principal advantages of this system are lower maintenance cost for gilts and higher sale value per

pound as compared to older, heavier sows.

For maximum economy such a system usually includes a favorable arrangement—exchange or high-resale value—for keeping down the cost of boars.

Boars

Use production-tested meat-type boars if they are available at a price consistent with their test record. A poor production test should eliminate the boar as a prospective sire.

Ignore minor defects in a boar unless the females have similar defects. The boar should excel in characteristics that are weak points of the sows he will breed.

Performance Information

If you must select a boar on type and appearance alone, wait until he is at least 6 months old. At this age, defects as well as desirable traits can more readily be observed than at younger ages.

Sometimes you must choose between a boar from a herd with high performance records and a boar of superior appearance from a herd with no performance record. When you make this choice, select on the basis of records rather than appearance.

Consider the boar's individuality and records of near relatives—dam, sisters, or brothers. The next most important qualities of a boar to con-

Crossbred Stock

Crossbred pigs have some advantages over their purebred parents. Crosses of lines or breeds usually improve prolificacy, survival, growth rate, and feed efficiency of pigs, and milk production of sows.

Two breeding plans for obtaining maximum benefits of hybrid vigor are—

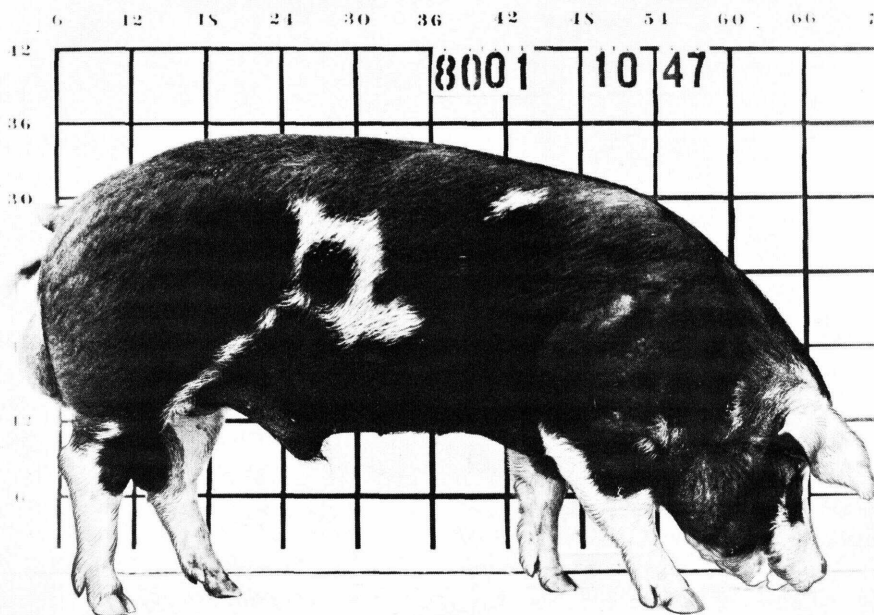
- **Rotational crossbreeding.** It consists of using purebred sires of three or more breeds in a regular sequence or rotation. For example, females of breed A are mated to males of breed B, replacement females of AB cross are mated to breed C males, and females from this mating (ABC) are mated to breed A males. This sequence is re-

peated as long as it gives satisfactory results.

- **Crossbreeding, and rotating unrelated lines within a purebreed** have similar effects. Rotating lines usually results in less vigor than a breed cross but produces greater uniformity.

The improvement obtained under either system depends on the genetic merit and the combining value of the stocks used.

Breed associations, State and Federal experiment stations, and extension services sponsor programs for evaluating hog performance and quality. They also help hog breeders find superior breeding stock.



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A desirable meat-type boar.

sider are a moderately long body, good bone, and sound feet and legs. He should have masculine character, be smooth, not coarse, and have good muscular development in his ham and loin. His reproductive organs should be clearly visible and well developed.

Number of Boars

If the herd exceeds 15 sows and the sows are handled as a single group, use two or more boars. This will permit comparisons among the offspring of different boars and provide a way to select boar replacements on a progeny-test basis.

Avoid breeding animals with ruptures of the navel, sexual abnormalities such as hermaphroditism and cryptorchidism, and scrotal ruptures.

Do not use animals from litters with pigs that have defects. A single defective pig should rule out the selection of full sisters and brothers as breeders.

A boar should not be used for breeding until he is 8 months old. Keep a superior boar as long as he will fit into the breeding plan. Avoid close inbreeding such as parent-offspring or full brother-sister matings.

FEEDS

Swine are fed chiefly cereal grains and their byproducts. To these are added protein and other supplements to provide a complete ration. This ration should contain proteins, carbohydrates, fats, minerals, and vitamins.

Grain

Corn is the staple grain used for feeding hogs. For best results, supplement corn with protein, calcium, phosphorus, and pasture or legume hay. For growing or finishing pigs, feed ground or shelled corn with a protein-mineral supplement. Grinding corn for hogs is not economical unless you plan to use it in a complete mixed diet.

Little wheat is fed to livestock. However, it is worth about 3 to 5 percent more than corn as a hog feed.

Good, sound barley, weighing 46 pounds or more per bushel, is 90 to 95 percent as good as corn. Lighter weight indicates lower feeding value. Barley should be ground or crushed. Do not feed scabbed barley.

Rye seems less palatable to hogs than other grains. Feed it ground with corn, wheat, or barley. Rye is dangerous if it contains ergot. Do not feed rye to pregnant sows; the ergot it may contain induces miscarriages.

Oats differ in feeding value—on the basis of percentage of hulls. The more hulls, the less weight per bushel and the less feeding value. As a replacement for corn, up to one-fourth of the diet, ground oats equals the replaced corn in feeding value, pound for pound.

Oats is a better feed for growing pigs and brood sows than for market hogs. Because oats has a high fiber content, it reduces energy intake and thus tends to retard excessive fat. You may want to use oats in the final stage of finishing market hogs.

Grain sorghums are nearly equal to corn as swine feed. They are slightly higher in protein content but lower in fat. Thresh sorghum for swine. Grinding grain sorghum seldom pays unless it is handfed.

Rice is rarely fed to swine unless it is damaged, low-grade, or exceptionally cheap. It is generally worth about 85 percent as much as corn.

Proso or hog millet is grown mainly in the extreme northern section of the West North Central States. It is worth from 85 to 100 percent of the value of corn.

Many grain byproducts are used to feed swine either because of special nutrient content or favorable prices. Some byproduct feeds are hominy and gluten meal from corn, "oat clippings" and feeding oatmeal, wheat bran shorts and middlings, barley, rye middlings, rice bran, and rice polish. For complete information on feeding value of these byproducts you should consult a textbook on feeds.

Cooking and Soaking Feeds

Cooking does not improve the feed value of grains. However, potatoes, soybeans, field beans, and velvetbeans are improved by cooking.

The protection against spread of disease more than compensates for any slight decrease in feeding value due to cooking garbage.

When it is impractical to grind whole barley or oats or when corn becomes very hard and dry, these grains may be slightly improved in feeding value by soaking.

Protein Supplements

Grain Substitutes

If your farm is located in an area where grains are not the most plentiful feed crops, you can substitute other feeds in the ration.

- Cull or surplus potatoes are occasionally fed to swine. Use potatoes—they should be cooked—only partially to replace the grain portion of the diet. For best results feed no more than 4 pounds of potatoes per pound of concentrates.

- Yams or sweetpotatoes are fed to swine principally in the South. There, yams usually outyield corn. Their disadvantages are high-labor cost and low protein, calcium, and phosphorus content. They may be fed cooked, dehydrated, or raw.

Often, yams are harvested by grazing or hogging-off. For best results supplement yams with about one-third to one-half of the usual allotment of grain, plus protein and minerals.

- Molasses, when sufficiently cheap, can replace part of the grain in swine diets. Molasses and sugar are used in pelleted feeds and starter diets for baby pigs.

Root crops—mangels and turnips—are usually relished by swine. They are not economical to feed. Good legume pasture or hay is more efficient.

Silage is not suited for growing-finishing pigs. However, when properly supplemented with concentrates, silage is a good feed for pregnant sows. It costs less than conventional all-concentrate gestation diets.

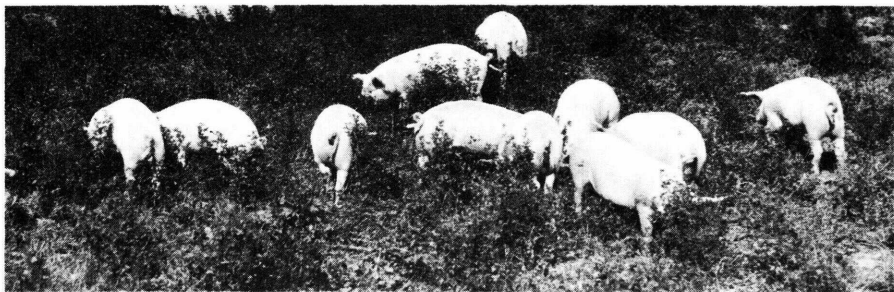
Animal Protein

Byproducts of milk, cheese, meat, and fish are valuable protein supplements to grain.

The amount of liquid skim milk or buttermilk needed to balance a corn diet differs with size and age of the pigs. Weaning pigs (56 days old) need 4 to 6 pounds of milk to each pound of corn. Feed 4 to 6 pounds of milk per pound of corn for 25- to 50-pound pigs; 2½ to 3 pounds of milk per pound of corn for 50- to 100-pound pigs; 2 to 2½ pounds of milk per pound of corn for 100- to 150-pound pigs; 1½ to 2 pounds of milk per pound of corn for 150- to 200-pound pigs; and 1 to 1½ pounds of milk per pound of corn for pigs over 200 pounds. Although the proportion of milk to corn changes as shown above, the pig eats more grain as he grows, so that the daily requirement is about constant. A pig weighing 40 to 50 pounds will gain rapidly and efficiently if full-fed on corn with legume hay available and a daily allowance of 6 pounds of skim milk or buttermilk throughout the growing and finishing period.

If barley or wheat replace corn or corn is fed on good pasture, reduce the amounts of milk by one-third to one-half.

Whey is worth about half as much as skim milk. If you feed whey with corn or barley, also feed a vegetable protein concentrate—linseed meal, soybean meal, or cottonseed meal.



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Feeder pigs on alfalfa pasture.

Condensed or dried whey, skim milk, and buttermilk are good protein feeds. They are generally priced too high for economical swine feeding, except in starter diets for early weaning or creep-feeding baby pigs.

Use meat scrap and tankage as standards for evaluating other protein concentrates.

Meat or fish byproducts are most efficient in a trio-type supplement mixture. This mixture combines a legume hay or meal with protein concentrates from both animal and vegetable sources.

Vegetable Protein

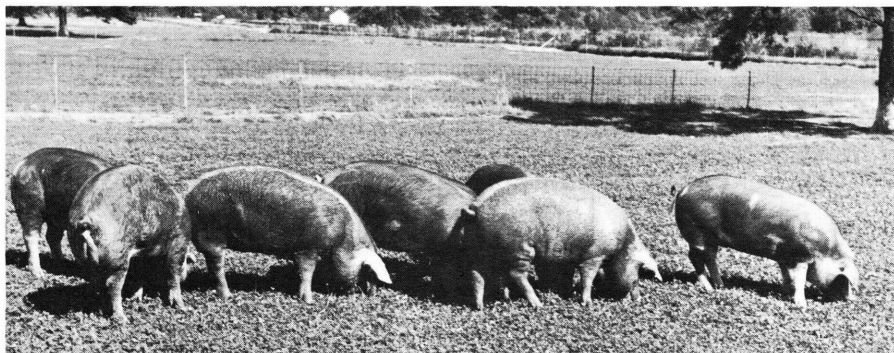
Soybean oilmeal is satisfactory as

the only protein supplement to grain if pigs are fed on good pasture with vitamin B₁₂ and mineral supplements. The same applies to drylot feeding if a legume hay or meal is included in the diet.

Cottonseed meal alone is unsafe for unrestricted feeding to swine because of its free gossypol content. It should be fed in trio-type mixture or combined with animal byproducts.

Peanut oilmeal is a good source of protein for swine. If you feed it as the only protein source, add calcium to the ration or, you can feed peanut oilmeal with an equal amount of fishmeal, tankage, or meat scrap.

Corn and soybeans are often



12893A

A breeding herd on ladino pasture.

Garbage

Garbage feeders produce more than 2 million market hogs annually. Sterilizing or cooking garbage to prevent spread of disease is a legal requirement in almost every State since the national outbreak of vesicular exanthema in 1952.

Garbage differs widely in feeding value. The difference is due to the amount of inedible refuse in the garbage.

Carcasses of garbage-fed hogs shrink more, dress out at slightly lower weights, and are softer than grain-fed hog carcasses. However, the low cost of the feed usually makes garbage feeding profitable.

interplanted for grazing or hogging-off. However, raw soybeans are inferior to soybean oilmeal for all classes of swine.

Peanuts are grown in many sections of the South to be hogged-off. They produce soft pork but are usually an economical feed.

Rate of gain may be increased by feeding a supplement such as tankage with peanuts, but this is usually not as economical as hogging off with only salt and calcium supplements.

Minerals

Minerals are necessary for good swine nutrition. The minerals most needed are salt, calcium, and phosphorus. Lesser amounts of potassium, sulfur, iron, and man-



Self-feeders reduce labor costs.

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"Hogging off" is an economical way to harvest a corn crop.

ganese also are required. Under normal conditions zinc, cobalt, copper, magnesium, and iodine are essential in only minute or trace amounts.

Practically all feeds contain minerals. The combination of feeds that you use determines the amount of extra minerals needed in a ration. Because pasture and harvested forages have a greater percentage of minerals than seeds and their byproducts, pigs fed on pasture require less extra minerals than pigs fed in a drylot. Animal protein concentrates are also rich sources of minerals.

Almost any mineral mixture that supplies the needs of swine and is palatable enough to be eaten freely is satisfactory. For example, a mixture of equal weights of steamed bonemeal, ground limestone (or air-slaked lime), and salt is palatable. It contains the major elements needed for supplementing grain feeds. Use trace-mineralized salt that will supply requirements of the minor elements.

Supply a mineral mixture to hogs in boxes or self-feeders where it will be dry and available at all times. It may be mixed with the protein part of the diet, or incorporated at about 1.5 percent into a complete mixed diet.

Where hogs are raised in barns or on feeding platforms, mineral supplements are important. Frequently it is profitable to design mineral mixtures to fit the diets of different ages and classes of swine.

Vitamins

Most feed combinations used for swine feeding are adequate in most of the essential vitamins.

Swine fed pasture or fresh green forage, get practically all the vitamins they need except D and B₁₂. If you cannot feed fresh forage, include dehydrated alfalfa meal or high-quality legume hay in the ration.

To supply vitamin D, add small quantities of A and D feeding oil or irradiated yeast to the diet. Or, expose the pigs to sunlight. To

TABLE 1.—*Examples of gestation and lactation diets*

Ingredient	Gestation			Lactation (complete)
	Hand fed (complete)	Silage supplement	Self fed (complete)	
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Yellow shelled corn (ground)-----	55.00	-----	41.25	45.00
Corn cobs (ground)-----	-----	-----	35.00	-----
Oats (ground)-----	15.00	-----	-----	15.00
Standard middlings-----	-----	-----	-----	17.50
Molasses, liquid blackstrap-----	-----	-----	5.00	-----
Alfalfa meal (dehydrated 17 percent)-----	15.00	15.00	5.00	5.00
Tankage or meat and bone scraps-----	3.60	25.00	6.00	3.60
Fishmeal-----	3.60	-----	-----	3.60
Soybean meal-----	3.60	52.90	6.00	7.50
Linseed meal-----	2.40	-----	-----	-----
Glauber's salt-----	.20	-----	-----	-----
Ground limestone-----	.40	-----	-----	.90
Bonemeal-----	.40	4.00	1.00	.90
Salt, trace mineralized-----	.50	2.00	.50	.70
Antibiotic plus vitamin B ₁₂ ¹ -----	.30	-----	-----	.30
Vitamin B ₁₂ ² -----	-----	.50	.10	-----
Vitamin A and D supplement ³ -----	-----	.25	.05	-----
B-vitamin supplement ⁴ -----	-----	.35	.10	-----
Total-----	100.00	100.00	100.00	100.00

¹ Supplement containing 1.8 grams antibiotic plus 1.8 mg. B₁₂ per pound.

² Supplement containing 10 mg. B₁₂ per pound.

³ Supplement containing 4,000 A and 500 D units per gram.

⁴ Supplement containing 2, 4, and 9 grams of riboflavin, calcium pantothenate, and niacin per pound, respectively.

supply vitamin B₁₂, include an animal protein concentrate or a vitamin B₁₂ supplement in the diet.

Antibiotics

Feeding small amounts of antibiotics to swine stimulates growth and slightly improves feed use. These drugs reduce the numbers of organisms that cause diarrhea and other digestive-system infections.

Antibiotics are most effective with animals under stress from infections of the digestive tract, with younger animals, and with animals whose diets have low nutritive value. The antibiotics that give the best results and are most widely

used for swine feeding are chlorotetracycline (Aureomycin), oxytetracycline (Terramycin), penicillin, and bacitracin.

Water

Hogs need a plentiful supply of water. The amount they drink depends on size, age, class of animal, and climate. A weanling pig (35 pounds) may drink about one-half gallon; a market hog (220 pounds), about 1 gallon; and a brood sow suckling a litter, about 5 gallons.

For watering troughs, allow a sow and litter (or 20 weanling pigs) at least 1 foot (on both sides) of trough space. The animals should

receive all they want to drink at least two or three times a day.

A supply of running water or an automatic system is laborsaving. An automatic cup will take care of about as many hogs (4 sows and litters or 80 weanling pigs) as 4 feet of water trough.

FEEDING

Brood Sows

To do her job efficiently, a brood sow needs an adequate diet. Overfeeding is more harmful than slight underfeeding. Either practice may be as harmful as a severe diet deficiency.

Pregnant sows may be hand-fed a complete mixed feed. Or, you can scatter ear or shelled corn to encourage exercise and put the ground part of the ration in troughs. If you feed this way, allow a gilt about $1\frac{3}{4}$ pounds of diet daily for each 100 pounds live weight if she is in a small lot, or 2 pounds if in a large lot. A comparable sow allowance is $1\frac{1}{4}$ to $1\frac{1}{2}$ pounds of com-

Methods of Feeding Pregnant Sows

HAND FED	
Feed	Pounds
Mixed diet (concentrate)-----	6
or	
Corn silage-----	12
Corn silage supplement-----	1
Yellow, shelled corn (ground)----	1

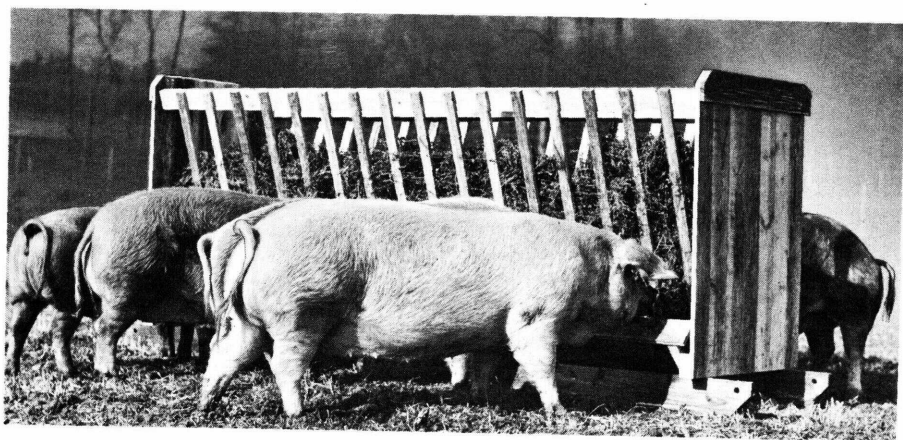
SELF FED	
Mixed diet (high fiber)-----	8

plete diet per 100 pounds of body weight.

The average gilt or sow requires about $\frac{3}{4}$ ton of complete premixed diet for the gestation period (hand fed) and a lactation period (self fed) of 56 days.

In estimating feed requirements for a herd of swine, allow approximately 1 ton of feed for each litter of pigs reared to 56 days. This will provide feed for boars, creep feed for pigs, and an allowance for some delays in getting sows settled.

For self feeding during pregnancy, mix ground legume hay or other bulky feed to prevent excessive fattening of the sows. This



Hay rack for brood sows.

76735B

practice reduces labor costs and produces more uniform condition of the sows. However, more total pounds of feed are required in this system and, for economy, you will need a cheap source of bulky feed.

Another economical gestation diet for sows includes well-eared corn silage, a protein supplement, minerals, and vitamins.

For 24 hours after farrowing give the sow water but no feed.

On the second day start her at about $2\frac{1}{4}$ to $2\frac{1}{2}$ pounds of feed and increase the ration each day. She should be on full feed, about 10 to 12 pounds, when the pigs are a week to 10 days old. As soon as she is on full feed, the sow may be self fed.

If a sow becomes constipated or suffers digestive upset, she may fail to come into milk or the milk may disagree with the pigs. For mild constipation, give a warm slop of wheat bran or of the regular diet containing a tablespoon of Epsom salt or Glauber salt.

In cases of severe constipation or complete milk failure, call a veterinarian. Proper medication may save the pigs and the sow.

If orphaned pigs have received colostrum for a day or two before the death of the sow, they are fairly easy to rear. You can feed them with a bottle and nipple or a shallow pan.

Without colostrum very rigid sanitation is needed to save the pigs. Use whole cow's milk or goat's milk as a substitute for sow's milk. Commercially prepared sow's milk substitutes, sometimes called synthetic milk, have nearly disappeared from the market but can be useful

for feeding orphan pigs, if available.

The easiest way to rear orphan pigs is to put them on another sow that has extra functioning teats. This is practical only if the foster sow farrowed within a day or two of the natural dam.

Growing-Finishing Hogs

Pigs, from weaning to market, may be self fed either a free-choice diet or a complete premixed diet.

The free-choice method saves grinding and mixing costs. The disadvantages are a slightly lower rate of gain and less uniform carcass finish. For the best results with this system, the grain portion and the supplement should be as near the same in palatability as possible.

Feeding a complete, premixed diet increases cost per pound of

Pig-Eating Sows

Killing and eating pigs is most often seen among animals that are nervous and excitable. Occasionally these sows eat one or more pigs. Some causes of pig eating are extreme heat, excessive pain in difficult or protracted labor, or loud noises.

Pig eating also occurs among sows having diet deficiencies or suffering from acute constipation due to faulty feeding or management. Although you cannot always prevent pig eating, good feeding and management should reduce it to a minimum.

TABLE 2.—*Guide for preparing a premixed diet for pigs*

Age of pigs	Approximate weight of pigs	Crude protein	Corn	Protein-mineral mixture ¹
Weeks:	<i>Pounds</i>	<i>Percent</i>	<i>Parts</i>	<i>Parts</i>
8 to 14.....	30 to 90----	16	75	25
14 to 20.....	90 to 160----	14	83	17
20 to 25.....	160 to 225----	12	92	8

¹ One hundred pounds of protein-mineral mixture consists of tankage, 10 pounds; fishmeal, 10 pounds; soybean meal, 35 pounds; alfalfa meal, 20 pounds; linseed meal, 20 pounds; and mineral mixture, 5 pounds. To make 100 pounds of mineral mixture, mix iodized salt, 33 pounds; steamed bonemeal, 33 pounds; pulverized limestone, 31.3 pounds; ferrous (iron) sulfate, 1 pound; copper sulfate, 0.1 pound; manganese sulfate, 1 pound; and zinc oxide, 0.4 pound.

diet—the cost of grinding and mixing. However, it increases rate of gain and improves feed efficiency. This increase is not always enough to overcome the added cost.

The premixed diet permits uniform distribution of additives and usually produces more uniform carcasses than if the hogs are fed a free-choice diet.

A further advantage of this diet is that it allows changes in ingredients. You can alter levels of fiber and protein according to needs for carcass quality in market hogs. The formulas in table 2 are suitable for feeding pigs 56 days old. You can feed them these mixtures until the pigs reach market weight of approximately 225 pounds.

This protein-mineral mixture may be self fed in a separate compartment with ground, shelled, or ear corn. Or, you can make it into a complete premixed diet by combining with the proper proportion of grain.

The amount of feed needed to add 100 pounds of live weight to a hog is important for economical production of pork. This amount

is influenced by age, health, inheritance of the animal, quality and combination of feeds, and environment.

Feed efficiency has been improved by the breeders' emphasis on changing from fat type to meat type as well as by advances in feeding "know-how." For instance, the complete diet just listed, when fed to good meat-type weanlings, has consistently produced 100 pounds gain up to market weight of 225 pounds for less than 350 pounds of total diet. Since these records were compiled, a number of cases have been cited of less than 300 pounds of feed producing 100 pounds of live weight gain in hogs.

Hog Pastures

Good pastures can supply a large part of the protein, calcium, and vitamins needed by swine.

With advances in swine nutrition, we are less dependent on pasture for growing-finishing hogs. However, pigs intended for feeding out on concrete or in a drylot, will do better if they have had access to abundant green grazing during their suckling period.

Proper pasture use benefits both pasture and animals. Grazing too closely harms the plants. Undergrazing allows plants to mature too much and lowers their digestibility and palatability.

Pastures differ widely in carrying capacity, the amount depending on the crop, soil fertility, and climate. A fair-to-good pasture may carry five to fifteen 100-pound hogs per acre.

Hogs on pasture distribute manure uniformly. This saves the expense of removing and distributing manure—a considerable cost in platform feeding.

Pastures are more valuable for the breeding herd than for other classes of swine. The feed requirements of pregnant sows can be nearly filled by pasture under ideal conditions. Normally, you can count on grazing to replace one-third to two-thirds of a gestation diet.

Permanent Pastures

In most hog-growing sections, farmers plan to keep hogs mainly on permanent pastures.

Place only a limited number of hogs on permanent pasture. Allow the pasture enough growth to produce a crop of hay.

Plants used for permanent pastures are alfalfa, Ladino, red clover, alsike, white clover, bluegrass, bur clover, bermudagrass, lespedeza, carpetgrass, crabgrass, and Dallis grass.

The first six are used in the northern half of the United States. Bluegrass and white clover often are grown together. Timothy often is grown with red clover. The other plants are grown in the South.

Of all the permanent pasture plants alfalfa and Ladino are preferred by hog raisers. Where these plants thrive, no other permanent pasture is necessary.

Fences

Pasture lots must be fenced "hog-tight." Most farmers use woven-wire fencing. On 10-acre or larger fields, use 26-inch fencing. Place one strand of barbed wire at the bottom of the fencing, just above the ground.

It is easier to keep hogs in large enclosures than in small ones. If an enclosure is small, a higher fence is necessary—32 to 36 inches.

An animal will soon locate a weak spot in a fence. The effectiveness of a woven-wire fence depends on

the setting and bracing of corner posts to stretch the wire taut. No matter how taut the fence is at first it cannot remain that way if the corner posts give any.

When a temporary fence around a small area is needed, use 6-inch fence boards to make panels. Attach the panels to temporary posts or stakes. Drive these into the ground. Or, you can use 26-inch woven-wire fencing and patented corner posts. Electrical fencing is satisfactory if pigs are trained to it.

Temporary Pastures

You can use temporary pastures on nearly every hog farm.

Every barnyard and small lot where hogs are kept should be disked and seeded at least once a year. Disking once a year—or better twice a year—does not allow time for the permanent pasture plants to get established.

The grasses common in permanent pastures are not useful in temporary pastures where there are hogs enough to keep the pasture closely grazed.

The most common temporary pasture plants are rye, oats, wheat, rape, soybeans, and cowpeas. These plants are grown in most parts of the United States. Seed temporary pastures heavier than a field for a grain crop.

Sow rye in the fall. In the northern areas, graze rye until it is covered by snow or made worthless by freezing. Rye may be grazed from early spring until hot weather. If the growth is rank, clip it with a mowing machine. Set the cutting bar as high as possible. In the South, rye may produce good grazing all winter.

In sections where winter oats is grown, the crop can be pastured the same way as rye. In the North, oats sown in the spring makes a good temporary pasture. The pasture period is short.

Rape often is sown with oats in the spring; Dwarf Essex is the variety of rape. You can seed rape from early spring until summer. When rye is 6 to 10 inches high, graze it heavily. It will keep grow-

ing and produce good, succulent feed.

Cowpeas and soybeans are sown in the spring. Sometimes they are planted together. Of the two, soybeans will usually make the best hog pasture. Select a variety that produces a large quantity of foliage and does well in your locality.

Turn in the hogs when the plants are 6 to 8 inches high. If the hogs eat the pasture down, take them out for a while to permit the plants to recover.

Dallis grass grows well in low, moist lands, makes a good growth in warm weather, and withstands close grazing well.

Sweetclover grows rapidly in good soil. Graze it heavily to keep the plants from becoming tough and fibrous.

MANAGING STOCK

Boars

To insure maximum usefulness of a boar—

- He should have the run of a good-size lot or pasture, convenient to the breeding pen, but away from lots in which breeding sows are kept.
- He should receive all the feed he will clean up twice daily during a heavy breeding season. Feed him the same diet listed for pregnant sows.
- If he is used only lightly after a long or a heavy breeding season, reduce his feed to keep him in a strong, thrifty condition.
- In hand-mating, allow a young boar to serve only one sow each day, except in emergencies. Limit an

TABLE 3.—*Farrowing calendar*¹

Date Jan.	Date due	Date bred	Date Apr.	Date due	Date bred	Date July	Date due	Date bred	Date Aug.	Date due	Date bred	Date Oct.	Date due	Date bred	Date Nov.	Date due	Date bred	Date Dec.	Date due	Date bred	Date Feb.	Date due	Date bred	Date Mar.	Date due
1	23	1	24	1	22	1	21	1	21	1	21	1	21	1	21	1	21	1	22	1	21	1	23	1	23
2	24	2	25	2	23	2	22	2	22	2	22	2	22	2	22	2	22	2	23	2	22	2	24	2	24
3	25	3	26	3	24	3	23	3	23	3	23	3	23	3	23	3	23	3	24	3	23	3	25	3	25
4	26	4	27	4	25	4	24	4	24	4	24	4	24	4	24	4	24	4	25	4	24	4	26	4	26
5	27	5	28	5	26	5	25	5	25	5	25	5	25	5	25	5	25	5	26	5	25	5	27	5	27
6	28	6	29	6	27	6	26	6	26	6	26	6	26	6	26	6	26	6	27	6	26	6	28	6	28
7	29	7	30	7	28	7	27	7	27	7	27	7	27	7	27	7	27	7	28	7	27	7	29	7	29
8	30	8	31	8	29	8	28	8	28	8	28	8	28	8	28	8	28	8	29	8	28	8	30	8	30
9	31	9		9	30	9	29	9	29	9	29	9	29	9	29	9	29	9	30	9	29	9	31	9	31
10		10		10	31	10	30	10	30	10	30	10	30	10	30	10	30	10	31	10	30	10		10	
11		11		11		11		11		11		11		11		11		11		11		11		11	
12		12		12		12		12		12		12		12		12		12		12		12		12	
13		13		13		13		13		13		13		13		13		13		13		13		13	
14		14		14		14		14		14		14		14		14		14		14		14		14	
15		15		15		15		15		15		15		15		15		15		15		15		15	
16		16		16		16		16		16		16		16		16		16		16		16		16	
17		17		17		17		17		17		17		17		17		17		17		17		17	
18		18		18		18		18		18		18		18		18		18		18		18		18	
19		19		19		19		19		19		19		19		19		19		19		19		19	
20		20		20		20		20		20		20		20		20		20		20		20		20	
21		21		21		21		21		21		21		21		21		21		21		21		21	
22		22		22		22		22		22		22		22		22		22		22		22		22	
23		23		23		23		23		23		23		23		23		23		23		23		23	
24		24		24		24		24		24		24		24		24		24		24		24		24	
25		25		25		25		25		25		25		25		25		25		25		25		25	
26		26		26		26		26		26		26		26		26		26		26		26		26	
27		27		27		27		27		27		27		27		27		27		27		27		27	
28		28		28		28		28		28		28		28		28		28		28		28		28	
29		29		29		29		29		29		29		29		29		29		29		29		29	
30		30		30		30		30		30		30		30		30		30		30		30		30	
31		31		31		31		31		31		31		31		31		31		31		31		31	

¹ Based on a 112-day gestation period.

aged boar to this same schedule if he is used through a long breeding season. A strong, vigorous boar may serve two sows a day when necessary.

Service on each of two consecutive days will increase average number of pigs born by about one pig per litter. Have your boars use a breeding crate at least enough so that they become accustomed to it. The crate is useful for mating females and males of different size.

Group mating is practiced where group standards are emphasized rather than individual excellence. Under a group system, run two or more boars with a group of sows to settle all the sows as quickly as possible.

The advantages of group mating are maximum litter size and minimum labor. Heavy service for short periods, followed by rest, apparently is not harmful to boars.

Sows

Select only growthy, well-developed gilts for breeding. They can be safely bred at 8 months of age. Gilts bred too young may produce fewer and smaller pigs. Also, they may have more trouble at farrowing and fail to grow out well after weaning their first litters.

Under the gilt-litter system, all gilts are finished for market immediately after weaning their first litters. Immediate marketing avoids the lower price usually paid for older, heavier sows.

Under other systems, gilts are kept for a definite number of additional litters, or for as long as they produce profitable litters.

If they are fed an adequate diet, pregnant gilts have little interruption in their growth.

Sows may produce two litters a year up to 6 or 8 years of age, or even longer. Commercial producers frequently discard sows at earlier ages than 6 or 8 years. Pure-bred breeders usually retain the best females as long as they remain productive.

A sow usually will farrow in 112 to 115 days after she is bred. Sometimes she will farrow in 110 days or she may go a few days over 115. By keeping a careful service record you will know when to expect the pigs.

Care of Sows During Pregnancy

Breeding and pregnancy are the most critical events in profitable swine production. Sows that are too fat at breeding time have smaller litters than thrifty sows. For best results, the sow should be in good condition, neither thin nor excessively fat.

"Flushing," or increasing the ration, for 1 to 3 weeks before mating tends to increase ovulation and conception rates.

Most important during pregnancy are adequate nutrition, exercise, and protection from extreme cold or heat. Improper feeding may cause deaths among unborn pigs or poor survival of the newborn pigs. For information on feeding sows during pregnancy see pages 10 and 11.

Farrowing Quarters and Equipment

Farrowing quarters are variations of three basic patterns.

The conventional "square" pen should be at least 6 by 8 feet for a gilt and 8 by 8 for a sow.

The farrowing crate or stall should be 20 by 72 inches for a gilt; 24 by 84 inches for a sow. Provide an enclosed area, 18 inches wide on each side of the crate for the pigs.

The round pen or house should be 6¾ to 7 feet in diameter for gilts or sows.

An ideal temperature for the farrowing house is 55° to 65° F., if the house is adequately ventilated. Because a newborn pig chills easily, you should provide some heat in the protected resting area for at least 5 days.

The amount of heat needed differs. It may be supplied by infrared-heat lamps or electric hovers in cold climates. Use a 100- to 125-watt light bulb mounted in a metal reflector in warm climates. Because any type of heating device can cause fire, you should install heaters carefully.

Sometimes it is difficult to make the farrowing house temperature suit both sows and newborn pigs. Extreme heat and humidity may have worse effects on farrowing than extreme cold. The nervous, restless behavior of sows suffering from heat usually causes pig deaths from mashing.

Occasionally, a sow may be lost from heat prostration. In the warmer sections of this country avoid farrowing in midsummer unless you provide some method of cooling the sows.

Farrowing house plans suitable for a particular locality may be obtained through your State extension service, county agricultural agents, or farm adviser.

If the sows have been running on pasture, move them to clean, new pasture and allow them to farrow there. Wash the sows before you move them if they are encrusted with mud and filth. This method is suitable for fall farrowing in practically all States. It is also suitable for spring farrowing in the South.

Care of Sows and Pigs at Farrowing

About 3 days before farrowing, move the sow to scrubbed, disinfected quarters. Wash her with soap and warm water, especially her teats. Place light bedding in the farrowing pen. You can use short hay or straw, peanut hulls, or shavings.

Reduce feed by one-third to one-half and watch for any sign of digestive upset or constipation.

Normal, healthy sows usually farrow without trouble. If possible, an attendant should be on hand to give any needed assistance. The assistance may be preventing pigs from chilling, warming them after chilling, or starting breathing in apparently lifeless pigs—by



A well-bedded farrowing pen.

N6376

clearing the membrane covering the head and massaging or slapping the pig's sides.

After delivery, paint the navel cords with iodine. Clip the tips of the eight tusklike needle teeth, and weigh and earmark the pigs.

The sow needs no feed for 24 hours after farrowing; she should have water available. If at all possible, feed the sow in an enclosure separate from her pigs. This will prevent her from crippling or killing the pigs accidentally while her attention is centered on eating. It also aids in keeping the farrowing pen clean because droppings are usually voided during the feeding period.

Sows and Suckling Pigs

Some sows are not able to nurse all the pigs they bear in one litter. If the sow does not have a functioning teat for each pig, transfer pigs

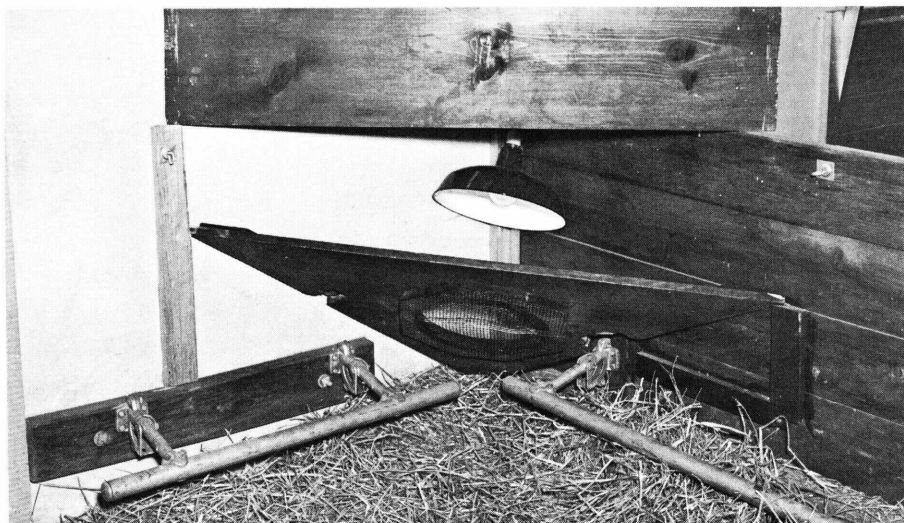
to a sow with a small litter. Make the change as quickly as possible.

Transferring pigs is rarely possible after more than 3 or 4 days, because teats that are not sucked dry up. Also, the odor of the pigs must be masked until they are accepted by the foster dam. To do this put a little oil or some harmless ointment on both the sow's own and adopted pigs.

Unless newborn pigs have almost immediate access to the soil, you must plan a way to prevent anemia. Several procedures for preventing anemia are—

- Provide clean soil or sod;
- Spray or paint copperas (ferrous sulfate) solution on the sow's udder;¹

¹ To make this solution, add 1 pound copperas to 1 quart hot water. Not all the copperas will dissolve. Add 1 cup syrup or honey to improve sticking ability and taste.



10291A

An electric pig hover.

- Dose with iron tablets;
- Use intramuscular injections of iron-dextran compounds.

Increase the sow's ration gradually until she is on full feed—when pigs are a week old. Feed the pig a starter diet in a “creep.” Litters from poor-milking sows are greatly benefited by creep feedings; litters from the better-milking sows do not eat enough to increase feed costs.

Pen the sow and litter separately for at least 1 week, preferably for 2 weeks.

Do not pen more than four sows and litters together under central farrowing house conditions. All the pigs should be within 1 week of the same age.

Limit the sows and pigs on one pasture to six sows with litters. These litters should be within 2 weeks of the same age.

Procedures that may cause stress in young pigs are castration, vac-

cination, weaning, and worming. Schedule these so that one stress effect wears off before the pig is subjected to another.

Unless male pigs are to be considered later for breeding, castrate them during the first 4 weeks. Pigs weaned at 4 weeks of age or less should be castrated at least 1 week before or after weaning. The operation should not follow cholera vaccination by less than 3 weeks.

Weaning

Most pigs are weaned at 5 to 8 weeks of age, under a 2-litter-per-year system. Reduce or cut off the sow's feed for 2 or 3 days before weaning to reduce milk flow and prevent udder trouble. Then, remove the sow from the pigs, leaving the pigs in familiar quarters.

If a sow's udder appears too full, return her to the pigs for suckling;

then, remove her immediately. A second return rarely is necessary, except with very heavy milkers.

A sow normally will come in heat 3 to 7 days after the pigs are weaned. She may be bred again at this time.

Recordkeeping

Every pig should be marked at farrowing time. The most satisfactory method is to notch the ears. Eartags of different kinds are used, but they tear out easily and the identity of the pig is lost.

Even if hogs are raised for market only, earmarking the pigs will help you select animals for the breeding herd. Reliable selection can be made only if the dam of the pig is known and her performance record is examined.

A system for earmarking is shown on page 25.

Small, sharp, side-cutting pliers do a good job of earnotching. For permanent marks, notch deeply enough to include a part of the cartilage of the ear. Notch the ears soon after the litter is farrowed, when wounds heal quickly.

Record every breeding date. Sample record forms are on pages 26 and 27. If you know the farrowing dates, you will be ready to feed and care for the sow.

Sanitation

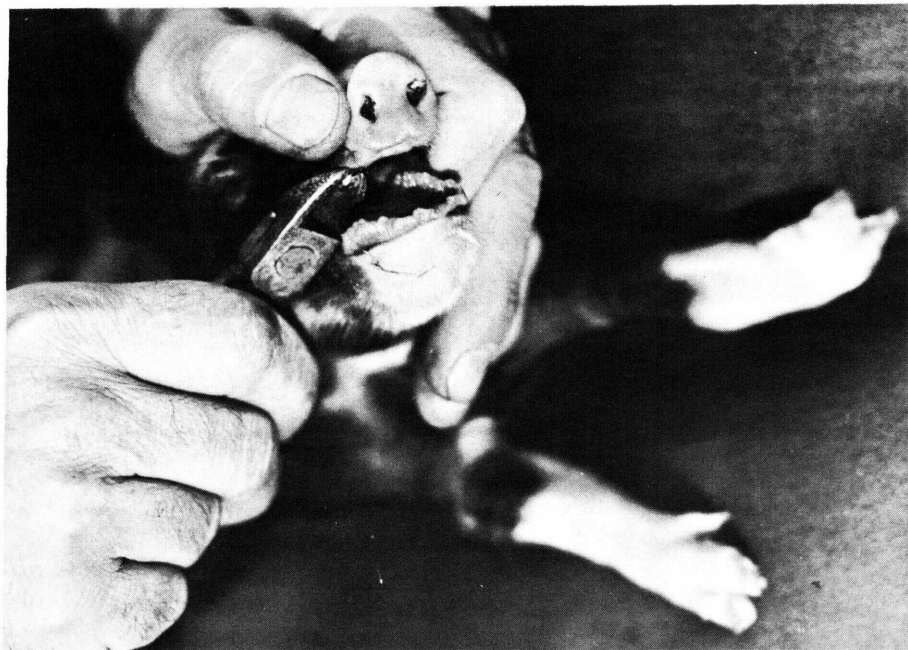
Results from the best methods of feeding and breeding will be lessened by faulty sanitation.

Keep farrowing houses and sleeping quarters clean. Change bedding frequently; do not let it become wet and foul.



Clean and disinfect the farrowing pen before placing the sow in it to farrow.

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To prevent injury to the sow, cut off baby teeth before young pigs nurse.

Feeder Pigs

Larger farms, specialization, and laborsaving systems have increased the demand for feeder pigs. Many grain producers can fit a large-scale feeding operation into their program. However, they cannot devote enough time to manage a breeding and farrowing system profitably.

Weanling pigs 6 to 10 weeks old weighing 30 to 50 pounds usually are sold as feeders. Garbage feeders, drug manufacturers, and farmers who wish to graze or "hog-off" crops usually buy larger pigs, up to

120 pounds.

Most of the demand is from the Corn Belt and small grain areas. However, the Southern States have increased their swine-feeding operations and are competing for feeder pigs.

Many areas grow abundant grazing and forage crops but produce only enough grain for breeding stock on good pasture. Whenever these conditions exist and you apply approved methods of breeding, feeding, and management, producing feeder pigs should be profitable.

The floors of the sleeping quarters become dusty. Dust is irritating to the lungs and may carry eggs of parasites. To reduce dust irritation clean the floors at least every 2 or 3 weeks; disinfect floors with a 3-percent solution of cresol. To make this, add 1 pint of cresol to 4 gallons of water.

Apply lime to pens and feeding places that are not plowed. The lime will aid in drying damp places and in disinfection. At least twice a year, disk all barnyards and lots or temporary pastures on which hogs are kept. If you plant pasture crops in these lots, the disking will be profitable in two ways.

Cooling Equipment

Shade

Hogs suffer greatly from heat and must have shade. Keep farrowing and individual hoghouses closed in hot weather to prevent hogs from lying in them. Hogs will seek shade even if they suffocate in it. Trees provide good shade if there are enough of them in a clump. Or, you can make a satisfactory shading structure with a framework about 4 feet high, made of posts or poles. Cover the top with hay, straw, or weeds to a depth of at least 2 feet. When dust accumulates under this shelter, wet the covering. The water will drip through to settle the dust and cool the air in the shelter. You can make permanent shelters from pipe, lumber, and conventional roofing materials.

Wallows and Sprinklers

A hog wallow made of concrete and located in a convenient shady place is a benefit in a hoglot. A mud wallow made by the hogs root-



Weigh young pigs at birth.

78657B



68890B

Pen together litters that are within 2 weeks of the same age.

ing a hole in the lot or pasture is a nuisance. It should be filled in.

It is impossible to keep a mud wallow sanitary. Hogs may drink the water that has become stagnant and foul.

The concrete wallow should hold 4 to 6 inches of water. Clean it frequently and refill with fresh water. To control lice, spray enough crude oil to form a thin layer on the water. Apply the spray about every 10 days.

If you feed hogs on concrete and a pressure water system is available, use fog-type sprinkler nozzles, such as those used in fuel oil burners, to cool the hogs.

HEALTH

Among the important health problems of hogs are cholera, erysipelas, brucellosis, tuberculosis,

necrotic enteritis, atrophic rhinitis, swine influenza, and parasitic infestations.²

Ask your veterinarian about the preferred times, methods, and number of vaccinations and other disease control measures needed to protect swine in your area.

Diseases

If you suspect that one of your animals is sick, ask your veterinarian about the proper treatment.

Because some livestock and poultry have diseases that can be transmitted to hogs, the danger of permitting hogs to eat carcasses outweighs the feeding value. Carcasses should be burned or buried.

²Detailed information on disease of swine and internal parasites of swine may be obtained from your county agricultural agent or the U.S. Department of Agriculture.

Parasites

Parasites affect hogs of all ages and may cause death—particularly among small pigs—reduce vitality, and prevent best and most rapid development.

The most damaging internal parasites are large roundworms, kidney worms, thorn-headed worms, lungworms, and intestinal threadworms.

The principal external parasites are sarcoptic mange mites and sucking lice. Most of these species are found in practically all hog-raising areas.

Internal Parasites

Most swine parasites can be controlled by sanitation including—

- Clean, disinfected farrowing pens;
- Sows washed clean before farrowing;
- A “clean” trip to clean pastures for sows and their litters;
- Clean pastures for the pigs until they are at least 4 months old.

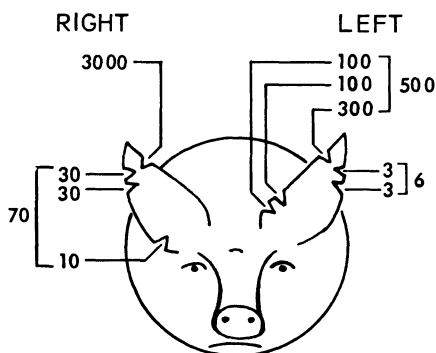
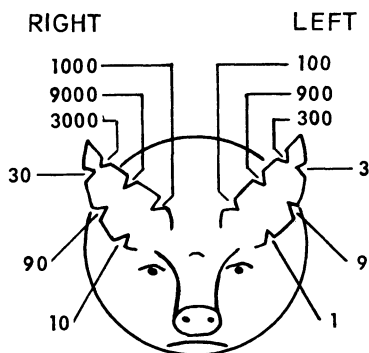
Internal parasites can also be controlled by feeding pigs exclusively on milk, skimmed milk, or whey for periods of 3 successive days at intervals of 2 weeks, or by feeding one of these daily instead of one grain feeding.

Pigs should be treated to control large roundworms at weaning and again about 2 months later. Use dry sodium fluoride—technical grade, tinted—at a concentration of 1 percent by weight, in *dry*, ground feed for 1 day.

Pigs should be slightly underfed the day before treatment. On the day of treatment, give them about two-thirds as much medicated feed as regular feed.

Caution

Sodium fluoride is poisonous, and containers should be conspicuously labeled and stored out of reach of children.



BN-12278

Notch pig's ears, for marking, soon after farrowing. The example shows how an animal would be marked for the identification number 3576—one notch for 3000, 300 plus 100 plus 100 to indicate 500, 30 plus 30 plus 10 to indicate 70, and 3 plus 3 to indicate 6.

LITTER RECORD

Data on sow:	Weight (Lb)	Condition*	Sire's Herd No.	Litter No.
At farrowing .....	.....	.....	Breed	Date farrowed
21 days after farrowing .....	.....	.....	.....	Date recorded
56 days after farrowing .....	.....	.....	Dam's Herd No.	Breed
Observer	Pen No. ....	.....	Breed	Strain

[illegible]

*1. Good. 2. Medium. 3. Poor.

16-47125-1

10-47126-1



78115B'

This shelter, with bales of straw for walls, furnishes protection in winter. With the straw walls removed it provides shade in summer.

Ordinarily, no other treatments are necessary or advisable. The treatment should not be given to pregnant or lactating sows, or to any animals showing symptoms of gastroenteritis.

External Parasites

For treatment against mange, mites, and lice, several insecticides

are safe and effective—lindane, toxaphene, malathion, methoxychlor, DDT, coumaphos, and ronnel. Carbaryl, ciodrin, and dioxathion are also safe and effective for eradicating lice. All these insecticides may be used as sprays.

Guide for Mixing Sprays

Insecticide formulation	Minimum days from last application to slaughter	Percentage of insecticide desired in spray	Amount of formulation to mix with water	
			100 gallons	5 gallons
Methoxychlor:				
EC, 25 percent.....		0.5	2 gallons.....	13 ounces.
WP, 50 percent.....		.5	8 pounds.....	6½ ounces.
Lindane:				
EC, 20 percent.....	30	.03	20 ounces.....	2 tablespoons.
		.05	1 quart.....	3 tablespoons.
WP, 25 percent.....	60	.03	1 pound.....	Do.
		.05	1½ pounds.....	5 tablespoons.
Toxaphene:				
EC, 60 percent.....	28	.5	5½ pints.....	4½ ounces.
WP, 40 percent.....	28	.5	10 pounds.....	8 ounces.
DDT:				
EC, 25 percent.....	30	.5	2 gallons.....	13 ounces.
WP, 50 percent.....	30	.5	8 pounds.....	6½ ounces.
Malathion:				
EC, 57 percent.....		.5	1 gallon.....	6 ounces.
WP, 25 percent.....		.5	16 pounds.....	13 ounces.
Coumaphos (Co-ral ¹):				
WP, 25 percent.....		.5	do.....	Do.
Ronnel (Korlan ¹):				
EC, 24 percent.....	42	.5	2 gallons.....	Do.
WP, 25 percent.....	42	.5	16 pounds.....	Do.
Carbaryl:				
WP, 50 percent.....	7	.5	8 pounds.....	6¼ ounces.
Ciodrin:				
EC, 47 percent.....		.5	8½ pints.....	7 ounces.
Dioxathion:				
EC, 47 percent.....		.15	2½ pints.....	2 ounces.

EC=emulsifiable concentrate; WP=wettable powder.

¹ Trade names are used in this publication solely for the purpose of providing specific information. Mention of a trade name does not constitute a guarantee or warranty of the product by the U.S. Department of Agriculture.

Producing Purebred Hogs

Producing registered, purebred breeding stock is a highly specialized and competitive business. A beginner should confine his efforts to producing market hogs until he acquires experience in breeding, feeding, and management.

After he has learned these procedures and has considered some of the special skills that contribute to success in the purebred business, he will be better able to judge his prospects for success.

Breeding animals are different from market animals. Breeding hogs need a frame and constitution that will last for several years rather than for the 5 or 6 months needed to reach market weight. The breeding animal should have the desired type body and appearance to impress prospective buyers. You cannot always obtain this development with minimum-cost methods.

The demand for superior breeding stock is always strong. For the breeder who can produce superior animals, profits can be generous.

A pedigree is no guarantee of merit. Rearing cull purebreds will usually lead to losses.

In selling breeding stock, cull the herd closely and offer for sale only animals of merit. The percentage of hogs in the herd that should be sold for slaughter differs. It depends on the quality of the animals, how they were fed, and the quality of their parents. A herd would be above average in quality if 50 percent of the animals proved desirable as breeders.

Surplus breeding stock can be sold publicly or privately. The public sale has advantages. All the stock is sold at auction in 1 day and the buyer sees what he is buying. Disadvantages of public sales are the time and expense involved in making arrangements—advertising, building the sale ring, and providing the lunch—and the possibility of bad weather.

The private-sale system requires a different plan of advertising and considerable correspondence. Be careful never to overestimate the quality or value of the animals.

A common mistake made by purebred breeders is that they do not cultivate the trade of neighboring farmers. They spend too much time and money trying to interest distant purchasers.

PRECAUTIONS

Insecticides are poisonous to man and animals. Use them only when needed and handle them with care. Follow all directions and heed all precautions on the labels.

Keep insecticides in closed, well-labeled containers in a dry place. Store them where they will not contaminate food or feed, and where children and pets cannot reach them.

Avoid repeated or prolonged contact of insecticides with the skin. Avoid inhalation of insecticide dusts or mists.

When handling insecticides, wear clean, dry clothing. Wash your hands and face before eating, drinking, or smoking.

Avoid spilling insecticides on your skin, and keep them out of the eyes, nose, and mouth. If any is spilled on skin or clothing, wash it off the skin and change clothing immediately.

If insecticide gets in the eyes, flush them with plenty of water for 15 minutes and get medical attention.

If an insecticide is swallowed, induce vomiting by giving 1 tablespoon of salt in a glass of warm water; repeat until vomit fluid is clear. Have victim lie down and keep quiet. *Call a physician immediately.*

If a person suddenly feels sick while using an insecticide, or

shortly afterwards, call a physician immediately.

In all cases of insecticide poisoning, make the insecticide container and label available to the physician.

Protect fish and wildlife. Do not contaminate lakes, streams, or ponds with insecticide. Do not clean spraying equipment or dump excess spray material near such water.

Avoid drift of insecticide sprays to nearby crops or livestock.

Use carbaryl not oftener than once every 4 days.

Do not treat sick animals.

Do not treat animals less than 3 months old with coumaphos; spray animals 3 to 6 months old only lightly; do not use with synergized pyrethrins, allethrin, or synergist.

Do not spray animals for 10 days before or after shipping or weaning or after exposure to disease.

Do not spray animals at the same time as you use oral drenches or other medication, such as phenothiazine.

Do not dip animals less than 3 months old in lindane or dioxathion.

Do not reapply dioxathion or ronnel within 2 weeks.

Use lindane dusts and DDT dusts and sprays only once.

This is a *Consumer Service* of USDA